

ORDER NO: 89-180

WASTE DISCHARGE REQUIREMENTS FOR:

UNION OIL COMPANY OF CALIFORNIA  
DBA UNOCAL  
RODEO, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. Union Oil Company of California, hereinafter Unocal or the discharger, owns and operates a petroleum refinery located at Rodeo, Contra Costa County as shown in Figure 1. The refinery produces fuels and lubricants and is classified as a lube refinery as defined by U.S. Environmental Protection Agency in 40 CFR 419.40. Daily crude throughput consists of approximately 80,000 barrels of oil. The refinery began operations at this location in 1896. Wastes generated from the manufacturing processes have been deposited at various locations at the refinery site at different times in the past.
2. This Order addresses three active surface impoundments, one inactive land treatment area, seven inactive waste disposal sites, the tank farm areas and several sites recently found to be contaminated with hydrocarbons. The three surface impoundments are operating units. The land treatment area and the seven disposal sites are defined as inactive units because they were not in operation at the time California Code of Regulation, Title 23, Chapter 3, Subchapter 15, hereinafter called Subchapter 15, became effective (January 1, 1985). This Order also addresses other areas of potential concern to water quality.
3. The refinery site is in a flat floored valley lying between Crockett and Rodeo, adjacent to San Pablo Bay. The valley drains an area of approximately 1,100 acres, of which approximately 40% is occupied by the refinery. Interstate Highway I-80 separates the main refinery facilities from the southern, mainly undeveloped portion of the site. Elevations range from 700 feet to sea level. The refinery is located on a northwestern plunging asymmetrical syncline comprised of interbedded silty sandstone, siltstone and claystone of upper Miocene age.
4. The facility discharges approximately 2.7 million gallons per day (Mgd) of treated process wastewater and an average of 43 Mgd of once through cooling saltwater. Both discharges are regulated by Board Order No. 89-002, NPDES Permit No. CA0005053. Process wastewater and contaminated stormwater

runoff are treated at an on-site wastewater treatment plant. The treatment process consists of an oil/water separator, dissolved air flotation (DAF) thickener, activated sludge with addition of powder activated carbon, clarifier and sand filter.

5. The discharger submitted a Report of Waste Discharge on January 29, 1988 which includes the following operating waste management units:
  - a. Primary Storm Basin has a capacity of 2.3 million gallons (Mg) and receives contact stormwater runoff and process water when the capacity of the wastewater treatment plant and the 20.8 Mg of storm water storage provided by three newly constructed above ground storage tanks is exceeded. The basin may also receive process waste water resulting from treatment plant upsets, breakdowns, or maintenance. The stored water is pumped to the treatment plant as treatment capacity permits. Soil beneath the basin was not sampled due to a concrete lined bottom.
  - b. Main Storm Basin receives overflow from the Primary Storm Basin when the storage capacity of the Primary Storm Basin is exceeded. The basin should receive storm water intermittently from storm events with a 25 year recurrence interval. The wastewater received by the Main Storm Basin is pumped to the treatment plant as capacity permits. The capacity of the Main Storm Basin is approximately 7.2 Mg.
  - c. Effluent Safety Basin has a capacity of about 1.3 Mg. In the past the basin received a mixture of once-through saline cooling water and treated process waste water. The basin presently receives only once-through saline cooling water and is regulated by an NPDES permit. Sludges removed during past operations were placed in SWAT Site 6 where investigations have indicated the presence of oily soils potentially originating from the sludge disposal operations. Based on this information, further investigation for the potential presence of oily soils at the Effluent Safety Basin is required.

The Primary Storm Basin has a concrete pad bottom, and gunite-covered side slopes, precluding pond bottom sampling. The Main Storm Basin has an earthen bottom and gunite-covered side slopes. The embankments of both basins consist of compacted fill material. The underlying materials consist of Bay Mud deposits and, at the western end of the Main Storm Basin, an onshore sand bar. Sediments and water contained in all 3 basins were sampled and analyzed. The

Primary Storm Basin and the Effluent Safety Basin do not contain hazardous wastes according to Department of Health Services (DHS) criteria. The sediment sample from the Main Storm Basin contained elevated levels of soluble lead. However, DHS classified the material nonhazardous. Therefore, the three basins are not subject to the Toxic Pits Cleanup Act of 1984. The Primary and Main Storm Basins, however, are subject to Class II requirements of Subchapter 15, due to the concentration of organic pollutants in the sediments.

6. The Report of Waste Discharge does not present sufficient data to establish if waste migration has or has not occurred from the impoundments. The construction, drilling, screen and filter pack length/placement, and the detail of geologic logging of 'older' monitoring wells MW-1 through MW-6, have raised concern on the adequacy of their use in obtaining water quality and use of water level measurements as compared to the more recently constructed monitoring wells MW-7 through MW-16. Information from these newly constructed wells indicated the presence of visible hydrocarbons or hydrocarbon odors from soil cores. However, analyses of soils were not obtained for constituents typically present at this facility, including tests for total hydrocarbons, oil and grease, and volatile or semivolatile petroleum hydrocarbons. Based on the presence of hydrocarbon saturated soils, floating hydrocarbons and hydrocarbon odors noted in several monitoring wells and all soil borings around the impoundments, further investigations are required to more accurately determine ground water gradients, potential soil and ground water contamination, and identify potential contaminant pathways.
7. All soil samples from well and soil borings surrounding the Primary Storm Basin exhibited hydrocarbon odors. The data does not indicate if the source of the hydrocarbons is the Primary Storm basin or leakage from the nearby tank farm. No analyses for TPH were performed. Further investigation to determine the source of this contamination is required.
8. The northwestern end of the Main Storm Basin is underlain by a bay sand deposit which is present at the former shoreline of the San Pablo Bay embayment, cut off by the construction of a railroad embankment along the bay shoreline. The area was previously used as a waste and material disposal area before placement of fill and pavement. Up to 60 mg/kg of aliphatic hydrocarbon and other organic compounds have been detected in the soil beneath the basin. Free oil has been detected in well MW-1, screened in this sand unit. The extent of contamination present at the site is presently unknown. Further investigation is required to determine the extent of this bay sand and determine whether it serves as a

contaminant pathway for pollutant migration to San Pablo Bay.

9. Fourteen water samples from the Main Storm Basin monitoring wells were analyzed for volatile or semi-volatile hydrocarbons, but not for TPH. A sample of standing water from this basin was analyzed only for volatile organics and contained Benzene levels of 230 ppm and Toluene of 160 ppm. Soil samples from the water table zone or deeper were not analyzed, although data submitted described the presence of free hydrocarbons or detectable hydrocarbon odors. Only 14 soil samples derived from 25 borings and 13 wells were sent for analysis. No analyses for TPH or oil and grease were performed.
10. The soils beneath the Basin are more permeable than the  $10^{-6}$  cm/sec permeability required for Class II units. Studies conducted to date have not sufficiently determined if contaminant releases to groundwater and Bay waters have occurred from these surface impoundments.
11. Inactive waste management units are identified by the facility as described below. All of these units, except Site 1, are subject to Section 13273 of the Porter-Cologne Water Quality Control Act. This Section requires that a Solid Waste Assessment Test, hereinafter called a SWAT, be conducted to establish whether there has been any leakage of hazardous waste from a solid waste disposal facility to soils, the vadose zone or waters of the State.

On March 8, 1989 the discharger submitted SWAT reports titled: "Report of Additional Investigation of Old Hazardous Waste Disposal Sites 2 and 3," and "Report of SWAT Investigation of Hazardous Waste Disposal Sites 4, 5, 6, 7, and 8;" Volume I and II.

- a. Land Treatment Area (LTA) was used to treat oily wastes from October 1975 until January 14, 1983. This facility is located on the south part of the refinery site, and is comprised of two cells with a combined area of 6.4 acres. A revised Closure Plan and Post-Closure Plan was submitted on April 23, 1988 and approved on August 2, 1988.

Closure of this facility has been completed and consisted of further biodegrading organic hazardous waste constituents in-situ through continued land treatment. A clean soil cap and vegetative cover were placed over the site in October 1989. Post closure requires periodic groundwater and unsaturated zone monitoring and maintenance of the

cover. The post closure period is to continue for a nominal 30 years.

b. SWAT SITES

Site 1: A gasoline spill of about 80 gallons containing tetraethyl lead occurred in 1950. The contaminated soil was removed at the time and the site was declared as uncontaminated by DOHS. Therefore, further investigation did not include site 1.

Sites 2 & 3: are located on opposite sides of a groundwater divide created by the Tormey Hill ridge on the northern part of the refinery. Both sites were used to dispose of leaded gasoline tank bottom sludges (LGTBS). These sludges were generated from the periodic cleaning of 3 leaded gasoline tanks that were at Site 3. These tanks were dismantled in 1981. Site 2 was used from 1948 to 1980 and Site 3 from 1942 to 1944. LGTBS and contaminated soil were removed from both sites under the supervision and approval of DHS in 1985. A cleanup criteria of 500 mg/kg total lead was specified.

Soil and groundwater samples were analyzed only for lead, TPH, and pH during previous sampling rounds. Eleven mg/kg of soluble lead was detected in soil from Site 2. TPH up to 170 and 1,000 mg/kg was present in soils from Sites 2 and 3, respectively. Free petroleum products were noted in monitoring wells at both sites, as well as TPH in groundwater. Lead was detected in groundwater at Site 3.

The 1989 first quarter ground water monitoring report shows major changes in ground water elevation and flow direction at site 3, and flow velocities for both sites. Soluble lead decreased in all wells since the last sampling period. Free hydrocarbons continue to be noted in monitoring wells at site 3. No hydrocarbons were noted during this sampling round in site 2 wells, however, downgradient monitoring well MW2-7 was dry during all sampling episodes. Further investigations at these sites are necessary.

Site 4: is classified as a Class I waste pile and is located in the central portion of the refinery, northwest of Highway 80. The site was used for disposal of leaded tank bottom sludges (LGTBS) prior to 1945. A small spring above the site drains along the periphery of the site via an earthen channel, locally saturating soils around the site.

The initial soils investigations indicated concentrations of total lead up to 3,600 mg/kg (exceeding Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg,) organic lead up to 80 mg/kg (exceeding TTLC of 13 mg/kg,) TPH up to 3,500 mg/kg, and low levels of volatile and semivolatile organic carbons (VOCs and SVOCs). TPH is present in the groundwater. However, the levels of TPH are higher in background than downgradient wells. This indicates that the TPH may be from the waste deposits and/or other contamination sources upgradient from Site 4. The 1989 first quarter sampling round did not detect soluble lead or TPH above the reporting limit in any of the monitoring wells. The upgradient well, however, showed diesel range hydrocarbons at lower levels than previously detected, indicating that analyses for TPH should also be undertaken. Further investigations regarding the extent, depth and migration of contaminants may be required.

Site 5: is classified as a Class I waste pile and is located in the northwestern portion of the refinery on former tidal embayment close to San Pablo Bay. The site was used for disposal of LGTBS in 1945. The area is now paved, therefore, the exact location or extent of the site has not been accurately determined. The area is presently used for materials storage and as a salvage yard.

Analyses of soil samples taken from within the waste pile indicate total lead concentrations of up to 7,100 mg/kg and soluble lead concentration up to 92 mg/kg. However, during the first quarter 1989 groundwater sampling round, no soluble lead above the reporting limit of 0.005 mg/l was identified. Petroleum hydrocarbons were identified at concentrations ranging from 260 to 31,000 mg/kg in the diesel range, and 1,800 to 13,000 mg/kg in the gasoline range. Soil pH ranged from 4.0 to 9.4. Up to 8.27 feet of free petroleum products were measured in shallow wells including the background well. Dissolved petroleum products were detected in deeper wells. No monitoring wells have been installed close to the San Pablo Bay shoreline to intercept the uppermost and intermediate depth aquifers to determine if contaminants are entering Bay waters. Further investigations are required to determine the horizontal and vertical extent of free and dissolved hydrocarbon migration.

Site 6: is classified as a Class I waste pile and is located near the southern side of the refinery south of

Highway 80. The site which covers about 53 acres was used for disposal of wastewater primary treatment sludge, slop oil, emulsion solids and oily tank bottom sludges from 1954 to 1964. The wastewater sludge removed from the Effluent Safety Basin was disposed of at the northwest corner of the Site. The wastes were spread upon the moderately steep surface and tilled into the soil for biological decomposition.

Oil stained soils and small chunks of coke are noticeable on the ground surface. Total lead up to 6,500 mg/kg, soluble lead up to 200 mg/kg and TPH up to 1,300 mg/kg were detected in soil samples. Several other metals, VOCs and SVOCs were also detected in the shallow surface soil. The aerial extent of the disposal site has been reasonably well determined. Three groundwater monitoring wells were installed on the site during the latest SWAT investigation, with one well at the foot of the slope. TPH in the diesel range at a concentration of 0.27 mg/l was detected in groundwater from this well (MW6-31). No soluble lead was detected in any of the monitoring wells above the reporting limit of 0.005 mg/l. Surface run-off drains from the slope to a nearby creek, enhancing the potential for contaminant migration.

Site 7: is classified as a Class I waste pile which is located near the eastern limits of the refinery site, east of Highway I-80, adjacent to the product storage tanks. The site was used for disposal of oily tank bottom sludges from 1960 to 1973.

Waste constituents identified in soil samples include arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, vanadium, and zinc. TPH up to 1,100 mg/kg and several SVOCs with concentrations up to 26 mg/kg were detected in soil. Zinc and TPH were detected in groundwater in previous sampling rounds. The ponds have been bulldozed level and covered with one foot of fill material.

The existing 3 monitoring wells (MW7-18, MW7-23, MW7-24) are not adequate to establish the direction of groundwater flow or permit the preparation of a credible groundwater gradient map. No ground water or soil samples were collected outside of the perimeter of the disposal areas. The first quarter 1989 sampling results show TPH in the gasoline and diesel range in well MW7-18 exceeding reporting limits, having concentrations of 0.32 and 0.53 mg/l respectively.

Site 8: is classified as a Class I waste pile, located in the northwestern portion of the refinery on the former tidal embayment in close proximity to San Pablo Bay and site 5. The site was used for disposal of acidic sludge during the 1940s. The site is now filled and paved and used as an equipment storage area. Arsenic, barium, cadmium, copper, lead, and mercury were identified in soil samples. TPH up to 5,500 mg/kg and relatively high concentrations of VOCs and SVOCs were also identified. Field-tested Soil pH ranged from 2.5 to 9.5. Arsenic, cadmium, chromium, cobalt, copper, molybdenum, nickel, vanadium and hydrocarbon as TPH up to 410 mg/l were identified in groundwater. Free petroleum products, VOCs, and SVOCs were found in both background and downgradient wells.

The groundwater east of the site appears to be recharged by the PG & E channel and the Safety Basin discharge channel appears to be a discharge area for the shallow groundwater flow system. The PG & E channel shows minor amounts of floating hydrocarbons of unknown origin. The apparent groundwater discharge into the Safety Basin Channel must be investigated to assure that soluble hydrocarbons are not discharged into San Pablo Bay.

12. Hydrocarbon contamination was discovered beneath the main parking lot adjacent to the Effluent Safety Basin in late 1987. Free floating hydrocarbon and hydrocarbon saturated soil was discovered in several drill holes located throughout the western most portion of the refinery. Further site investigations were conducted in 1988/1989. The field investigation consisted of installing 30 additional monitoring wells and completing 48 soil borings. Measurement of free hydrocarbon product thickness ranges from 0.3 to 9.4 feet with an estimated volume up to 36,500 barrels. Due to the local groundwater gradient, the potential for migration of contaminants from this area into the Effluent Safety Basin and/or San Pablo Bay is considerable. The investigation was conducted only beneath a portion of the refinery which includes waste sites Nos. 5 and 8, the refinery's salvage yard, and part of the Wastewater Treatment Plant. The widespread TPH identified during this and earlier investigations suggests that the present study needs to be expanded.
13. Information received indicates that oil and product storage tanks and pipeline leaks and ruptures have occurred in the past. Recent studies of subsurface assessment of free hydrocarbon beneath the westernmost portion of the refinery site indicate the presence of product to be in close proximity to San Pablo Bay. No studies regarding the source



of this hydrocarbon contamination have been undertaken at the tank farms. Investigations of contamination at the nearby, and all other tank farms and at downgradient locations is therefore required.

14. All of the Waste Management Units listed in this Order are subject to this Order.
15. Section 13227 of the Water Code requires the Board to review closure plans submitted pursuant to Section 25246 of the Health and Safety Code for hazardous waste facilities in order to assure adequate protection of water quality. The Board may place conditions on its approval of these closure plans. Regulations contained in Title 22, California Code of Regulations which implement the Health and Safety Code, set a closure standard (Section 67211, Title 22) that includes minimization of migration of waste constituents to State waters. The Board finds that substantial compliance with the siting and construction standards contained in Subchapter 15 of Title 23 constitutes adequate minimization of waste migration for sites being closed.
16. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. This Order implements the water quality objectives stated in the Basin Plan.
17. The beneficial uses of San Pablo Bay in the vicinity of the site are:
  - a. Industrial service supply
  - b. Navigation
  - c. Commercial and sport fishing
  - d. Contact and non-contact water recreation
  - e. Wildlife and estuarine habitat
  - f. Fish migration and spawning
  - g. Preservation of rare and endangered species
  - h. Shellfish harvesting
18. The potential beneficial uses of groundwater in the vicinity of the site which is deeper than 100 feet are:
  - a. Industrial process water and service supply
  - b. Agricultural supply
  - c. Municipal and domestic supply
19. The action to issue Waste Discharge Requirements for continued operation of existing waste management units is exempt from the California Environmental Quality Act (Public Resources Section 2100 et. seq.) in accordance with Section 15301 of the California Administrative Code.

20. The Board notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
21. The Board in a public hearing heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, that the discharger and any other persons that own the land or operate these units shall meet the applicable provisions contained in Division 7 of the California Water Code and regulations adopted thereunder and shall comply with the following (unless otherwise noted, any references to Section and Articles refer to Subchapter 15 of Title 23):

A. Prohibitions

1. The treatment, discharge or storage of materials which may impact the beneficial uses of ground and surface water shall not be allowed to create a condition of pollution or nuisance as defined in Sections 13050 (1) and (m), respectively, of the California Water Code.
2. Migration of pollutants through subsurface transport to waters of the State is prohibited.
3. There shall be no discharge of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.

B. Specifications

Unless otherwise noted, any references to Sections and Articles refer to Title 23, Subchapter 15 of the California Code of Regulations.

The following Specifications apply as set forth in the Provisions:

1. General Specifications

- a. During waste disposal, handling, or treatment, no wastes shall be placed in a position where they can be carried into the waters of the State.
- b. The waste management units shall prevent migration of wastes to adjacent geologic materials, groundwater, or surface water, throughout the operation, closure, and post closure periods.

- c. The integrity of containment structures shall be maintained at all times.

2. Specifications for Operating Waste Management Units

- a. The containment structures for the units shall have a foundation or base capable of providing support for the structures and capable of withstanding hydraulic pressure gradients to prevent failure due to settlement, compression, or uplift.
- b. The units shall prevent migration of wastes to adjacent geologic materials, groundwater, or surface water throughout the operations site.
- c. The Primary and Main Storm Basins shall be in use only during periods of excessive prolonged heavy rainfall exceeding the capacity of the treatment system, or during periods of upset, maintenance or breakdown.

3. Specifications for Plume Tracking at the LTA Identified in Findings 11.a.

The Discharger shall conduct monitoring activities as specified in their approved closure and post-closure plan. Should monitoring results show evidence of plume migration, additional plume characterization of pollutant extent may be required.

- a. The discharger shall maintain all run-on and run-off control systems, routing ponded waters to the wastewater treatment plant.
- b. The discharger will establish and maintain an appropriate vegetative cover to prevent soil erosion.

4. Specifications for Inactive Waste Management Units

- a. A groundwater monitoring program must be developed and implemented at each inactive waste management unit in accordance with Article 5, of Subchapter 15.
- b. A corrective action program must be developed and implemented at each inactive waste management unit. The corrective action program shall have taken into account the results of the groundwater monitoring program for each specific site. If the

corrective action program proposes to leave the wastes in place, the program shall implement the applicable closure provisions of Subchapter 15 to the extent feasible and necessary.

5. Groundwater Monitoring Specifications

- a. The groundwater monitoring program will be in compliance with the California Code of Regulations, Title 23, Subchapter 15, Article 5.
- b. The compliance period for groundwater monitoring shall extend until the waste no longer poses a threat to water quality.
- c. The design and construction of the ground water monitoring system shall comply with the specifications outlined in Section 2555 (b) through (d) of Article 5, and as approved by the Executive Officer.
- d. Both the proposal and final reports shall provide detailed information regarding the placement and design of each monitoring well as subject to approval of the Executive Officer. For the purpose of providing guidance on the type of documentation required, limiting potential future concerns, and providing the information that may aid in evaluation of each monitoring well, the following information must be, at a minimum, provided:
  - o Drilling technique
  - o Type and make of drilling rig
  - o Bore hole diameter
  - o Justification for well design, including, but not necessarily limited to 1) screen and filter pack length and depth selection, 2) filter pack and screen slot selection, 3) thickness and placement method of seal above filter pack, 4) material and method of placement of backfill or annulus seal, 5) diameter and type of coupling(s) of screen, riser, and surface casing
  - o Ground surface, top of riser elevations referenced to MSL
  - o Identification of location of obtaining water level measurements and inside depth to bottom of monitoring well as referenced to this location
  - o Details of well development

- o Justification must be provided to any variance to the following generic well design criteria:
    - . Screen lengths exceeding 10-feet
    - . Screen or filter packs that extend through more than one permeable zone
    - . Filter pack interval which extends more than 2-feet below base of bottom most screen slot
    - . Filter pack interval which extends more than 2-feet above uppermost screen slot
    - . Screen/filter pack interval which is greater than 2-feet above or below permeable zone to be monitored
- e. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area of the waste management unit and comply with Section 2555 (e) through (g) of Article 5.
- f. Date and time of sampling, method of field sampling and treatment, field analytic data obtained, method of sample preservation and volume of reagents used and names of sampler shall be furnished in reports of investigations and cross indexed in the text as necessary.
- g. Records shall be kept of constituents to be analyzed, type of analytic method used, date and time when analyses were started, results of analyses, detection limits for each analysis, regulatory limits and chain of custody forms. Data submitted shall be shown in tabular form and properly cross indexed in the text for easy identification.
- h. Unsaturated zone monitoring shall be conducted where an unsaturated zone is present, as required in Section 2559.
- i. Water quality protection standards will be established by the Board according to the conditions outlined in section 2552. These standards shall be generated upon submittal of an approved groundwater quality monitoring program and based upon one year of background groundwater quality monitoring data collected at each waste management unit.

- j. Points of compliance will be established by the Board upon submittal of an approved groundwater quality monitoring program according to Section 2553.
- k. Statistical procedures as outlined in Section 2555(h) shall be used to determine whether the water quality protection standards have been exceeded at any unit.
- l. A detection monitoring program, as required in Section 2556, shall be implemented at each waste management unit, or group of contiguous waste management units.
- m. A verification monitoring program, as required in Section 2556 and 2557, shall be implemented at units where water quality impairment has occurred, or upon determination that a statistically significant increase in indicator parameters or waste constituents has occurred during detection monitoring at a waste management unit or group of units.

C. Provisions

Unless otherwise noted, any references to Sections and Articles refer to Title 23, Subchapter 15 of the California Code of Regulations.

- 1. The discharger shall comply with Prohibitions A.1. through A.3. immediately upon adoption of this Order.
- 2. All report submittals must be acceptable to the Executive Officer.
  - a. The report must include detailed site and piezometric maps of the water bearing zones. All laboratory analytic reports for soil and ground water samples shall be included, together with the requirements specified in B.5. Analyze for heavy metals, TPH, oil and grease, volatile and semi-volatile hydrocarbons as appropriate. No samples shall be composited. Furnish all relevant existing data and combine and interpret all data. Furnish remedial action proposals if waste migration is found to exist. All wells and borings must be continuously sampled and logged in descriptive detail to permit identification of sandy intervals or other lithologic changes no more than 0.1' in thickness. Variations to continuous sampling and logging must be approved

by staff. Estimate and show on the logs the percentages of lithologic constituents.

- b. Analytic field data of water samples must include pH, turbidity, electrical conductivity (EC) and temperature. Maps showing well locations must be of scalable dimensions. Piezometric water table maps of the unconfined and confined water tables must accompany all reports. Cross sections must show lithologic detail and must show borings and/or monitoring well locations, location and length of filter pack and seal, well screen length and static water level. Cross sections must be accompanied by a site map showing location of cross sections.

3. Primary and Main Storm Basin, and Effluent Safety Basin

Submit by April 30, 1990 a proposal detailing items a. through c. below. A report acceptable to the Executive Officer detailing the results of investigations shall be due within 180 days after approval of the proposal.

- a. Submit a proposal for the installation of additional monitoring wells and soil borings to more accurately determine if waste migration has occurred from or into the Primary Storm Basin, the Main Storm Basin or the Effluent Safety Basin. Furnish adequate rationale for the proposed boring and well locations and detail the design, drilling methods, soil sampling methodology, well installation, completion methods and development procedures to be used. Address deficiencies detailed in Findings 6. through 10.
- b. Submit a proposal to install additional monitoring wells or piezometers to accurately determine the ground water gradient in the western part of the site surrounding the waste management units. Detailed descriptions of analytic methods for water and soil must be included in the proposal and report.
- c. Submit a proposal and working drawings to perform necessary work to prevent infiltration of storm water in the Main Storm Basin into the sand underlying the northwest part of the basin.

4. Site 2 and 3

Submit by July 30, 1990 a proposal detailing work to be performed to develop the data requested below. A report acceptable to the Executive Officer detailing the results of investigations shall be due within 180 days after approval of the proposals.

- a. Submit a site specific proposal for soil and ground water investigation of heavy metals and hydrocarbons on each side of the drainage divide at Site 2 and 3. The plan must be in full compliance with the groundwater monitoring plan in accordance with Specification B.5. and Article 5, and address the deficiencies detailed in Findings 11.b. The report shall include a detailed discussion of at least three cleanup strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action.

5. Sites 4 through 8

Submit by July 30, 1990 a proposal detailing the work to be performed to develop data requested below, and to remedy the deficiencies detailed in findings 11.b. A report acceptable to the Executive Officer detailing the results of investigations shall be due within 180 days after approval of the proposals.

- a. Address in the proposal a soil sampling and groundwater monitoring plan of site 5 in accordance with Specification B. 5. and Article 5. The proposal must include plans for installation of additional monitoring wells in the shallow and deeper more permeable zones and soil borings, downgradient of site 5. Address all deficiencies detailed in the Findings. The report shall achieve full compliance with Specification B.5. according to the groundwater monitoring plan and include a corrective action proposal if required.
- b. Submit a proposal of expanded investigations of the extent of soil and groundwater contamination and determine the groundwater gradient at site 7. Furnish data and the rationale on proposed locations for soil sampling and ground water monitoring wells. Address all deficiencies detailed in the Findings.
- c. Present a proposal to investigate if hydrocarbons and/or heavy metals are migrating from the salvage



yard and the area of sites 5 and 8 into San Pablo Bay. Address all deficiencies detailed in the Findings.

- d. Submit a report evaluating the performance and adequacy of continued employment of the "A" monitoring wells in the monitoring program. The report is to identify wells potentially requiring replacement and is to detail abandonment method(s) that may be required. Specific attention is to be given to the potential for interconnection of water bearing zones and the suitability of wells utilizing screen lengths greater than 10 feet for obtaining representative water samples, analyses of which accurately reflect constituent concentrations at different depths, of varying types of hydrocarbons.
- e. Installation of any new monitoring wells shall be in compliance with Specification B.5.d. and must furnish adequate rationale for new or replacement well locations to monitor the uppermost or intermediate depth water bearing zones. Detail the design, methodology, well installation and completion methods and development procedures to be used. All wells must be continuously cored and logged in descriptive detail to permit identification of lithologic intervals no more than 0.1 foot in thickness. Estimate and show percentages of lithologic constituents.

6. The Tank Farms

Submit by October 30, 1990 a proposal detailing the work to be performed as detailed in the findings and below. Figure 4 indicates the areas considered to be included as "Tank Farms" to be included in this investigation. A report acceptable to the Executive Officer detailing the results of investigations shall be due within 210 days after approval of the Proposal. The discharger shall comply with Prohibition A.1., 2.

according to schedule. t5t54en

determine the source of free hydrocarbon pools and hydrocarbon contaminated soils and determine if there are or have been any discharges of waste constituents from the tank farm units to the soil and groundwater.

- b. If it is determined by the Executive Officer based on the information generated for Provision 6.a.

that waste constituents have been or are being released to soil and/or groundwater from any of these units, the discharger shall define the extent of the waste constituents in the soil and/or groundwater and submit a proposal for soil and/or groundwater corrective action. The proposal shall include a detailed discussion of at least three cleanup strategies and the estimated cost and consequences of each one. The alternatives must range from removal of all waste constituents to no action. Additionally, the discharger shall submit plans to prevent future releases from the unit(s).

7. Areas Contaminated with Hydrocarbons

Submit by October 30, 1990 a proposal detailing the work to be performed as detailed in the Findings and below. Figure 5 indicates the areas presently known to be contaminated with hydrocarbons, but the investigation shall not necessarily be restricted to these known areas only. A report acceptable to the Executive Officer detailing the results of investigations shall be due within 210 days after approval of the Proposal. The discharger shall comply with Prohibition A.1., 2. and 3. according to the following tasks.

- a. Submit a proposal acceptable to the Executive Officer to determine the extent and locations on site of areas contaminated with free hydrocarbons in soils. Propose strategies for removal and cleanup of free hydrocarbons detected in monitoring wells as determined in the investigation of the western part of the plant site. Additionally, the discharger shall submit plans to prevent future releases from the unit(s). The alternatives must range from removal of all hydrocarbons to no action.
- b. The discharger shall determine the extent of hydrocarbons in groundwater and submit a proposal for corrective action. The proposal shall include a detailed discussion of cleanup strategies and the estimated cost and consequences of each one.
- c. Submit a proposal to install wells to monitor the beach sand crescent ringing much of the former shore line and present under the northwestern part of the Main Storm Basin, to determine if hydrocarbons are migrating within this sand unit.

Include soil sampling methods and analytic parameters to be used.

- d. Present a proposal to investigate if hydrocarbons are migrating into or under the P G & E channel. Determine the extent and source of hydrocarbons which may be present north of the channel.
8. Technical reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted quarterly to the Board commencing October 31, 1990, covering the previous quarter. On a quarterly basis thereafter, the reports shall consist of a report that, (1) summarizes work performed since the previous report; (2) present updated water table and piezometric surface maps for all affected water bearing zones; (3) plan view maps showing the location of all monitoring wells and/or piezometers, at a scalable size.
9. The discharger shall submit by April 30, 1991 a proposed water quality monitoring program acceptable to the Executive Officer, pursuant to Article 5 of Subchapter 15. This submittal shall include a time schedule for implementation of the monitoring program.
10. All samples shall be analyzed by State certified laboratories using appropriate EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board staff review.
11. Copies of all correspondence, reports and documents pertaining to compliance with the Prohibitions, Specifications and Provisions of this Order shall be provided to the following agencies:
  - a. Department of Health Services, Toxic Substances Control Division.
  - b. Environmental Protection Agency - Region 9
12. The discharger shall permit the Board or its authorized representative, in accordance to Section 13267 (c) of the California Water Code:
  - a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any records are kept, which are relevant to this Order.

- b. Access to copy any records required to be kept under the terms and conditions of this Order.
  - c. Inspection of any monitoring equipment or methodology implemented in response to this Order.
  - d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.
- 13. The discharger shall file with the Regional Board a report of any material change in the character, location, or quantity of this waste discharge. For the purpose of these requirements, this includes any proposed change in boundaries, contours or ownership of the disposal areas.
  - 14. The discharger shall maintain a copy of this Order at the site so as to be available at all times to site operating personnel.
  - 15. The discharger shall notify the Board if during subsurface investigations conducted on the refinery site soil contamination is identified which may potentially have an adverse impact on ground or surface waters.
  - 16. If the discharger has commenced work under a program or plan approved by the Executive Officer and is in compliance with the schedule of work under that program or plan, then the discharger shall be deemed to be in full compliance with the program or plan even though all of the work or tasks to ultimately be performed have not been completed.
  - 17. The Board considers the property owner and site operator to have a continuing responsibility for correcting any problems with their reasonable control which arise in the future as a result of waste discharge or water applied to this property during subsequent use of the land for other purposes.
  - 18. These requirements do not authorize the commission of any act causing injury to the property of another or of the public, do not convey any property rights, do not remove liability under federal, state or local laws, and do not authorize discharge of waste without the appropriate federal, state or local permits, authorizations, or determinations.

19. The Board will review this Order periodically and may revise the requirements when necessary.
20. If the discharger is delayed, interrupted or prevented from meeting one or more of the time schedules in this Order due to circumstances beyond their reasonable control, the discharger shall promptly notify the Executive Officer of such delay. In the event of such delays the Executive Officer will consider modification of the time schedule established in this Order.

I Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on December 13, 1989.



STEVEN R. RITCHIE  
Executive Officer

Attachments:

- Figure 1: Location map
- Figure 2: Map of Inactive Waste Management Units.
- Figure 3: Map of Active Waste Management Units
- Figure 4: Map of Tank Farm Areas
- Figure 5: Map of Known Areas of Hydrocarbon Contamination

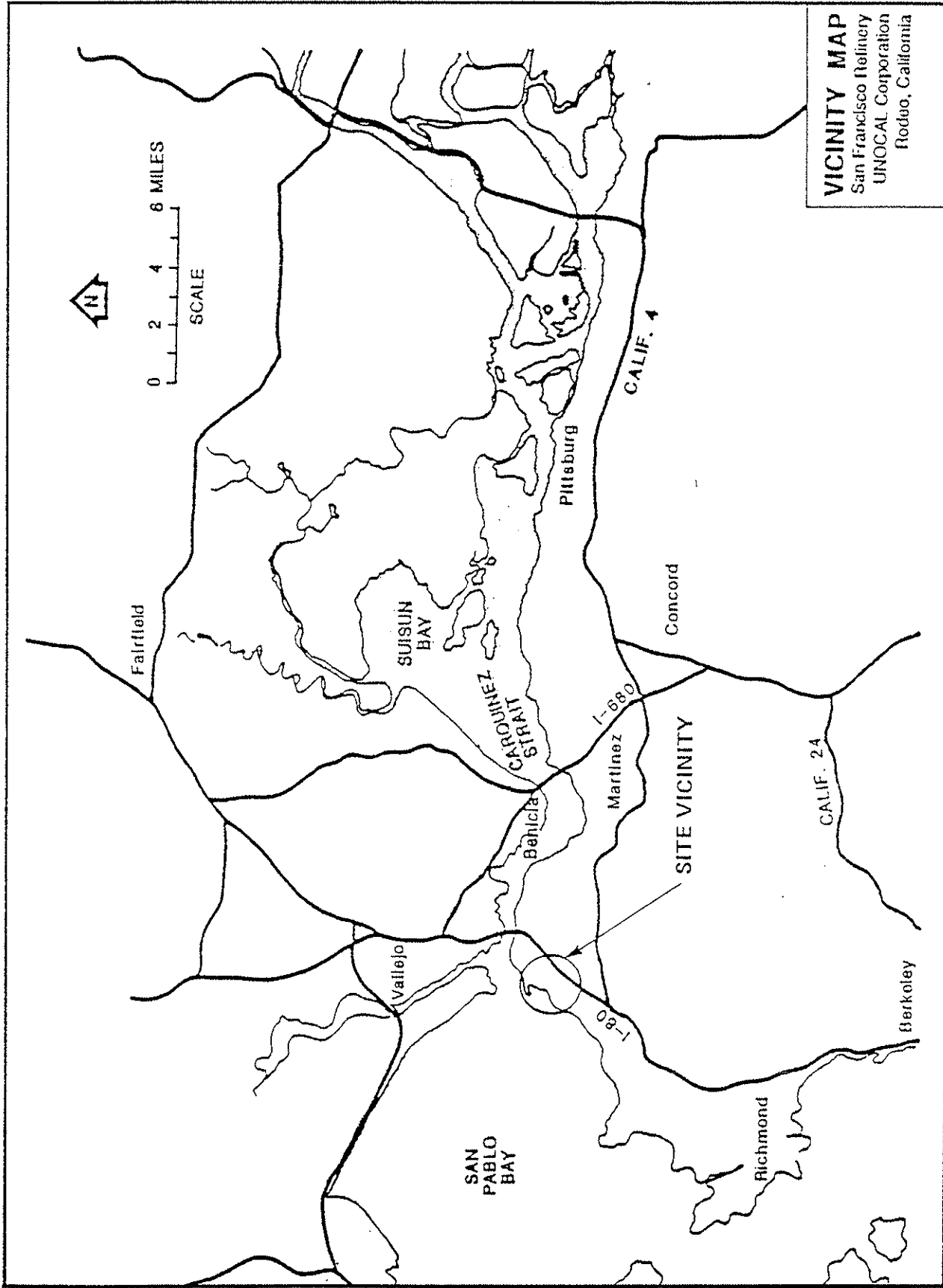
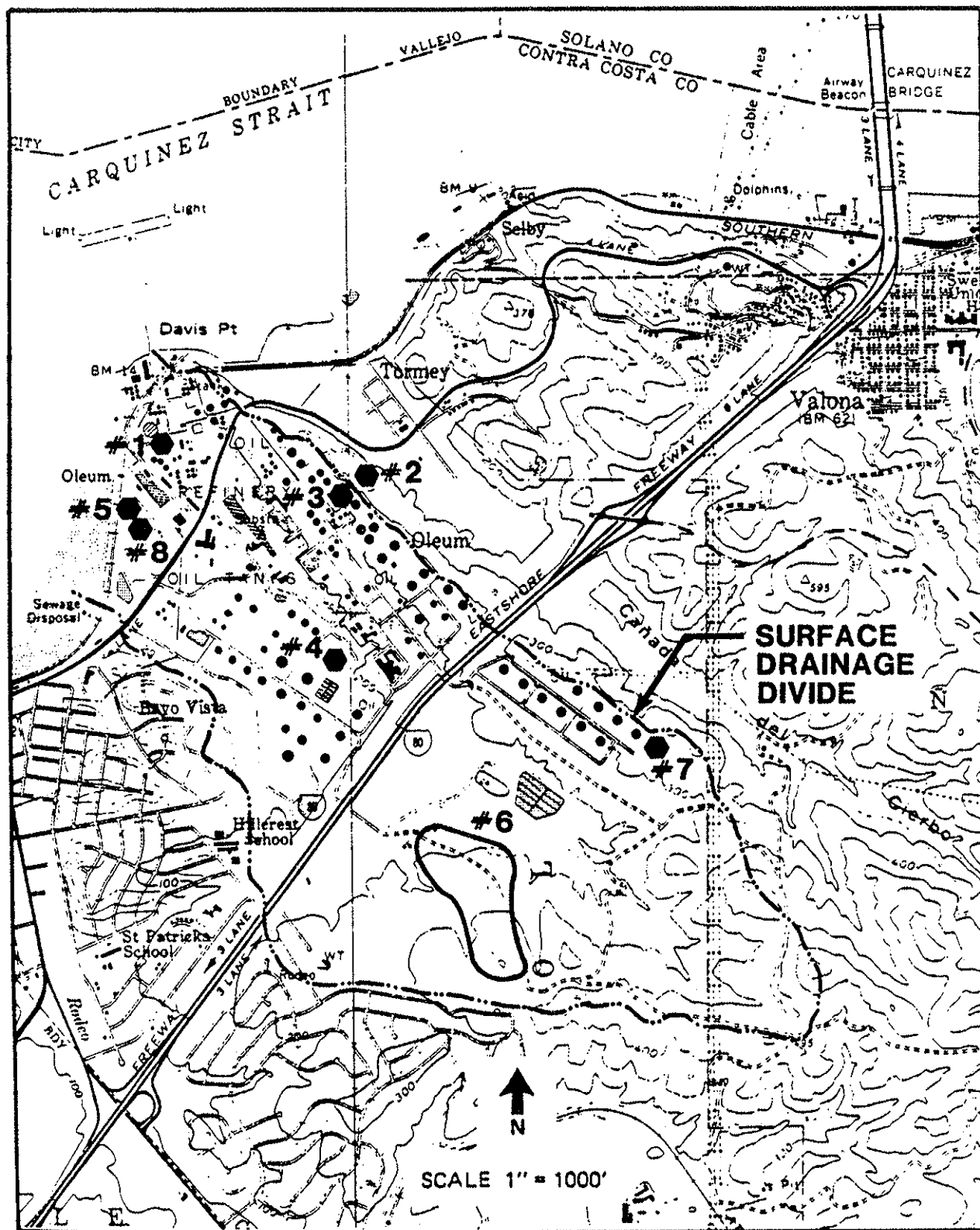


Figure 1- Vicinity Map



Location of Old Hazardous Waste Sites

Inactive Waste Management Units

FIGURE 3

FIG. 3 ACTIVE WASTE  
MANAGEMENT UNITS

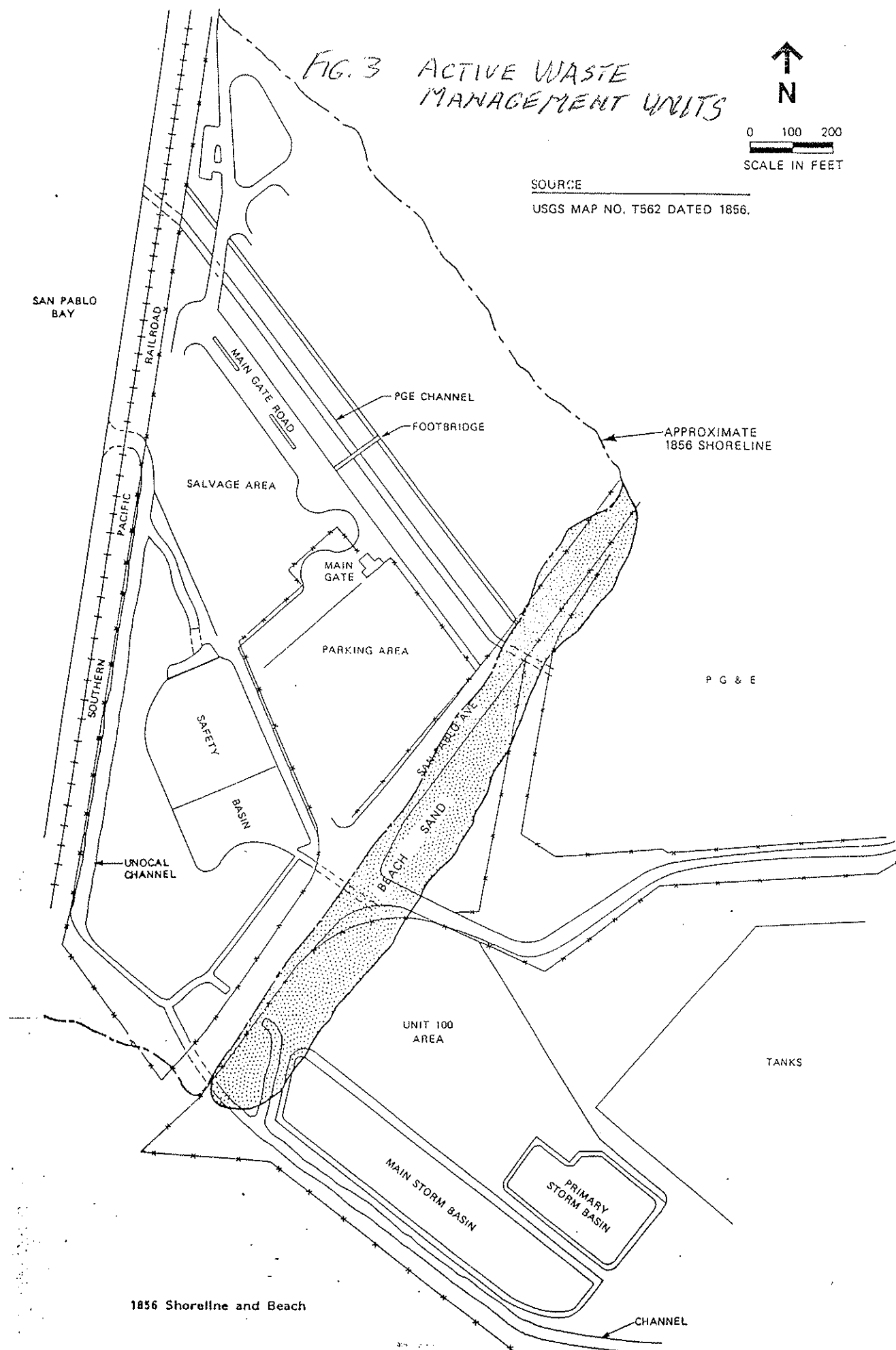


0 100 200

SCALE IN FEET

SOURCE

USGS MAP NO. T562 DATED 1856.



1856 Shoreline and Beach



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